

What is claimed is:

1. Apparatus for purging to atmosphere non-condensables from a volume of refrigerant, the apparatus comprising:

a pressure transducer coupled to the volume for measuring the pressure therein;

a temperature transducer disposed for measuring the temperature of vapor in the volume;

a purge valve coupled between the volume and atmosphere and operable between a closed condition isolating the volume from atmosphere and an open condition permitting exposure of the volume to atmosphere; and

a processor operating under control of a stored program for controlling operation of the valve,

the program including a purge routine responsive to measured temperature of the volume for determining an ideal vapor pressure in the volume corresponding to the measured temperature,

the purge routine being responsive to measured pressure in the volume exceeding a target pressure above the ideal vapor pressure for effecting a controlled operation of the purge valve until the measured pressure drops to the target pressure.

2. The apparatus of claim 1, and further comprising a pressure transducer valve coupled between the volume and the pressure transducer and operable between a closed condition isolating the volume from a pressure transducer and an open condition exposing the pressure transducer to the volume.

3. The apparatus of claim 1, wherein the controlled operation of the purge valve includes opening the valve, closing the purge valve when the measured pressure drops to the target pressure, remeasuring the pressure in the volume with the purge valve closed and, if it exceeds the target pressure, again opening the purge valve until the measured pressure drops to the target pressure, and repeating this process until the measured pressure with the purge valve closed does not exceed the target pressure.

4. The apparatus of claim 1, wherein the apparatus is part of a refrigerant recovery system including a recovery vessel defining the volume and means for recovering to the volume refrigerant from an associated vehicular refrigeration system.

5. The apparatus of claim 4, wherein the program includes a refrigerant recovery routine for controlling a refrigerant recovery operation and for operating the purge routine at plural times during a recovery operation.

6. The apparatus of claim 5, wherein the target pressure is a first target pressure, the refrigerant recovery routine operating the purge routine at a first time to purge the volume to the first target pressure and operating the purge routine at a second time to purge the volume to a second target pressure equal to the ideal vapor pressure.

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7. The apparatus of claim 5, wherein the first time is at the completion of a recovery operation and the second time is at the beginning of a next succeeding recovery operation.

8. Apparatus for purging to atmosphere non-condensables from a volume of refrigerant, the apparatus comprising:

pressure sensing means coupled to the volume for measuring the pressure therein;

temperature sensing means disposed for measuring the temperature of vapor in the volume;

purge means coupled between the volume and atmosphere and operable between a first condition isolating the volume from atmosphere and a second condition permitting exposure of the volume to atmosphere; and

control means responsive to measured temperature of the volume for determining an ideal vapor pressure in the volume corresponding to the measured temperature,

the control means including means responsive at a first time to measured pressure in the volume exceeding a first target pressure greater than the ideal vapor pressure for effecting a controlled operation of the purge means until the measured pressure drops to the first target pressure,

the control means including means responsive at a second time to measured pressure in the volume exceeding a second target pressure equal to the ideal vapor pressure for effecting a controlled operation of the purge means to purge the volume to the second target pressure.

9. The apparatus of claim 8, wherein the control means includes a processor operating under control of a stored program, the program including determining the ideal vapor pressure from a look-up table stored in memory.

10. The apparatus of claim 8, and further comprising a pressure transducer valve coupled between the volume and the pressure transducer and operable between a closed condition isolating the volume from a pressure transducer and an open condition exposing the pressure transducer to the volume.

11. The apparatus of claim 8, wherein the apparatus is part of a refrigerant recovery system including a recovery vessel defining the volume and means for recovering to the volume refrigerant from an associated vehicular refrigeration system.

12. The apparatus of claim 11, wherein the first time is at the completion of a recovery operation and the second time is at the beginning of a next succeeding recovery operation.

13. The apparatus of claim 8, wherein the controlled operation of the purge valve in purging to a target pressure includes opening the valve, closing the valve when the measured pressure drops to the target pressure, remeasuring the pressure in the volume with the valve closed and, if it exceeds the target pressure, again opening the purge valve until the measured

pressure drops to the target pressure, and repeating this process until the measured pressure with the purge valve closed does not exceed the target pressure.

14. The apparatus of claim 8, wherein the control means includes means for determining the target pressures by ascertaining from a look-up table a pressure corresponding to the measured temperature plus an offset value, the offset value for the first target pressure being a positive finite temperature and the offset value for the second target pressure being zero.

15. A method for purging non-condensables from a volume of refrigerant through a valve to atmosphere, the method comprising:

measuring the temperature of the volume,

determining an ideal vapor pressure in the volume based on the measured temperature,

measuring the pressure in the volume,

comparing the measured pressure to a first target pressure greater than the ideal vapor pressure,

controlling opening of the valve when the measured pressure exceeds the first target pressure until the measured pressure drops to the first target pressure, and

at a later time again measuring the pressure in the volume and comparing the measured pressure to a second target pressure equal to the ideal vapor pressure and, if the measured pressure exceeds the second target pressure, controlling opening of the valve until the measured pressure drops to the second target pressure.

16. The method of claim 15, wherein the ideal vapor pressure is determined by ascertaining from a look-up table a pressure corresponding to the measured temperature.

17. The method of claim 15, wherein the first predetermined pressure is higher than the second predetermined pressure.

18. The method of claim 15, wherein the volume of refrigerant includes refrigerant recovered from an associated vehicular refrigeration system, the first time being at the end of a recovery operation and the later time being at the beginning of a next succeeding recovery operation.

19. The method of claim 15, wherein each of the controlling steps includes opening the valve until the measured pressure drops to a current target pressure, closing the valve, then remeasuring the pressure in the volume and, if it exceeds the current target pressure, again opening the valve until the measured pressure drops to the current target pressure, repeating the sequence until the measured pressure when the valve is closed does not exceed the current target pressure.

20. The method of claim 15, wherein each of the target pressures is determined by ascertaining from a look-up table a pressure corresponding to the measured temperature plus an offset value, the offset value for the first target pressure being a positive finite value and the offset value for the second target pressure being zero.